

as now claimed, the "ends" of the segments now include both the lower member on which the fins and brush seal are supported as well as the upper T-shaped extension. No new matter is added.

Rejection under 35 USC 102

The rejection hereunder over Bagepalli is respectfully rejected in light of the amendments and the following remarks.

Bagepalli discloses a "mounting block" (30) having ends that are circumferentially displaced (column 2, lines 3-12) from the labyrinth seal segments on the inner, sealing portion. As now amended, claims 1 and 6 required that the corresponding portions of the inventive seal segment be disposed without any circumferential displacement. Accordingly, the claims are not anticipated.

The Examiner's contention that retractability of the seal is inherent is vigorously traversed. The Examiner's allegation is that segmentation of the seal inherently leads to the ability to retract. All seals are segmented for this type of machine because that is the only way they could be replaced without totally dismantling the device. Steam turbines can be as long as the length of a city block. It would be impossible to replace a seal that was not segmented without dismantling the entire casing and removing the shaft. And then how is the shaft to be supported while slipping an unsegmented seal by the support means? With a segmented seal, only the overlying portion of the casing needs to be removed and the seal segments can be removed and replaced without disassembling the rest of the casing or removing the shaft. Accordingly, segmentation of the seal does not inherently lead to retractability.

Further, the retractability of the seal is not for accommodating thermal expansion, it is because during start-up and shut down there are vibration modes in the shaft that, if the seal were at normal clearance, would damage the fins on

the seal (thereby requiring it to be replaced sooner and decreasing the turbine efficiency in the meanwhile) (see ¶¶ 12-13 of Shifler declaration discussed below). Moreover, the Examiner's supposition that segmentation would accommodate thermal expansion is incorrect: because thermal expansion is a linear effect ($\Delta L = C_p \cdot \Delta T$) but the circumference of the seal is a fixed length, if the seal were heated that much it would buckle; further, it would expand in the radial direction both inwardly and outwardly (and inward expansion would be detrimental).

This rejection should now be withdrawn.

Obviousness rejection under 35 USC 103

The rejection hereunder over the combination of Bagepalli and Brandon is respectfully traversed.

Submitted herewith is a Declaration by Richard Shifler under Rule 1.132 filed in application 09/199,127 (now U.S. Pat. No. 6,318,728). This submission is timely because it is in response to a new rejection made under 35 USC 103 (MPEP 716.01).

Mr. Shifler's declaration attests that since his employment with General Electric from 1947 to 1968, with Delaval from 1968 to 1987, and from 1988 to 1996 with RMX, in the field of turbomachinery, that prior to the filing of the '127 application he was not aware of a brush seal as part of a retractable seal (¶ 16).

Mr. Shifler also attests (¶¶ 24 and 26-31) that it is would not have been obvious to make a brush seal part of a retractable seal "because of the complex interaction of the forces necessary to open and close a retractable seal."

As noted above, there is no teaching, suggestion, or indication that Bagepalli contemplates a retractable seal.

In fact, it is suggested that the combination is improper because it would be inoperative as a retractable seal. As shown in Figs. 1-3 of Bagepalli, the top

face 26 of the sealing portion would abut the bottom portion of the neck of the T-shaped "mounting block" (not numbered) of the adjacent segment, and so would be physically prevented from moving outward. The only way to change this situation is to have Applicants' arrangement where the top and bottom portions of the seal are circumferentially aligned. Thus, the suggested combination would be inoperative, and modification of Bagepalli would directly contravene the structure described and taught by the reference.

Accordingly, this rejection should now be withdrawn.

Change in Correspondence Address

A change in correspondence address is submitted herewith. To assure that correspondence is sent to the undersigned attorney of record, the Examiner is request to assure that the change in correspondence address is promptly entered.

In light of the foregoing amendments and remarks, withdrawal of all the rejections, and further and favorable action, in the form of a Notice of Allowance, are now believed to be in order, and such actions are earnestly solicited.

Respectfully submitted,

CERTIFICATE OF MAILING OR TRANSMISSION – 37 CFR 1.8

I hereby certify that I have a reasonable basis that this paper, along with any referred to above, (i) are being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Commissioner of Patents and Trademarks, Washington, D.C. 20231, or (ii) are being transmitted to the U.S. Patent & Trademark Office in accordance with 37 CFR § 1.6(d).

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APPENDIX OF MARK-UPS OF AMENDMENTS

1. (Twice Amended.) A retractable packing segment for an apparatus that extracts work from the expansion of a gaseous working fluid, said apparatus comprising a rotating shaft disposed in a casing, said packing segment disposed in a ring formed from a plurality of packing segments and centered on an axis defined by said shaft to provide a seal therearound, said segment comprising: an inner face for sealing against said shaft; at least one brush seal disposed on the inner face of said segment and an outer face supporting a T-shaped extension; opposing side ends of said segment cut parallel with radii of said axis; and said brush seal having opposing ends at least one of said ends cut non-parallel with radii of said axis.

6. (Twice Amended.) A retractable brush seal for an apparatus that extracts work from the expansion of a gaseous working fluid, said apparatus comprising a rotating shaft disposed in a casing, said brush seal in the geometry of a ring formed from a plurality of adjacent abutting packing segments and centered on an axis defined by said shaft to provide a brush seal therearound, each said segment comprising: an inner face for sealing against said shaft and an outer face supporting a T-shaped extension; at least one brush seal disposed on the inner face of said segment; opposing ends of said segment cut parallel with radii of said axis; said brush seal having opposing side ends cut non-parallel with radii of said axis, one of said side ends cut angled to form a tongue extending past the segment end and the other of said ends cut at the same angle relative to said segment to provide a groove for accepting a tongue formed by a brush seal on another packing segment.